Passenger Rail Corridor Study
Tucson to Phoenix

STATION AREA TYPOLOGY DEFINITIONS

Submitted by:

Arizona Department of Transportation
Multimodal Planning Division
206 S. 17th Avenue, Mail Drop 310B
Phoenix, AZ 85007

Submitted to:

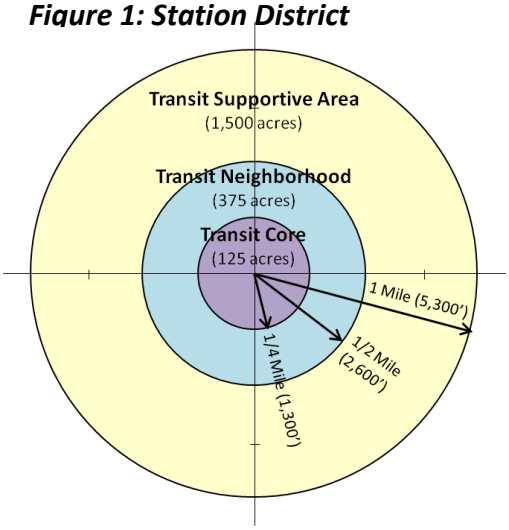
Federal Transit Administration
Federal Rail Administration

Version 1.0 | July 2012

TABLE OF CONTENTS

STATION TYPOLOGY DEFINITIONS

Figure 1: Station District



Station area planning involves designating the area within a five- to twenty-minute walk, or one-half mile, of a transit station as a distinct type of place. Actual boundaries will vary based upon the unique physical characteristics of each station area. Station areas are generally located at centers of significant higher-density economic and cultural activity. In addition, each station area should have a well established network of pedestrian pathways and infrastructure, including sheltered waiting areas, street furniture, low-scale lighting, shade, bike racks, and retail/service uses tailored towards pedestrian traffic. It is understood that for this corridor, these higher density areas occur primarily in Tucson and Phoenix Metropolitan areas. However, there are opportunities for station area planning throughout the corridor which will be discussed in this overview. More specific station locations and station area boundaries will be determined in subsequent planning phases for the Tucson to Phoenix Passenger Rail Corridor.

The station area consists of (approximately) the 500 acres within one-half mile around a transit station, composed of the transit core and transit neighborhood. These areas are surrounded by the transit-supportive area (not part of the station area). Transit geography is further defined below, with summary characteristics and illustrative photographs provided in Tables 2 to 5 on pages 4 to 7. Table 6 provides the definitions for supportive transportation infrastructure required to sustain each station type.

- ***Transit Core:*** First one-quarter mile, or approximately 125 acres, of the station area centered at the transit station.
- ***Transit Neighborhood:*** Second one-quarter mile, or approximately 375 acres, of the station area surrounding the transit core.
- ***Transit Supportive Area:*** Next one-half mile radius around transit station, beyond transit core and transit neighborhood, comprising an additional 1,500 acres.

The following station typology has been developed for the intercity and commuter rail service between Tucson and Phoenix. Intercity rail service is proposed to stop at the system's hub and regional stations; commuter rail service is proposed to stop at all four station types.

Figure 2: Rail Services at various Station Types

		Station Types			
		System Hub	Regional Station	Local Station	Transit Emergent Station
Rail Service	Intercity Rail	●	●		
	Commuter Rail	●	●	●	●

1. ***System Hub:*** Would generally be located at the heart of a major metropolitan area, typically a downtown, characterized by a high-density mix of housing and employment types (e.g., corporate offices, government offices, high-rise apartments and condominiums, regional civic

uses, major mixed-use development, cultural and entertainment facilities, and supportive retail and services). Densities may be higher within a quarter-mile radius of stations than elsewhere. System hub stations would be served by both regional and commuter rail service, and would accommodate substantial intermodal connections to the local transportation network including fixed-guideway transit (light rail, streetcar), buses, shuttles, taxis, cars, bicycles, and pedestrians. Hub stations typically attract ridership from within a 15- to 25-mile radius around the station.

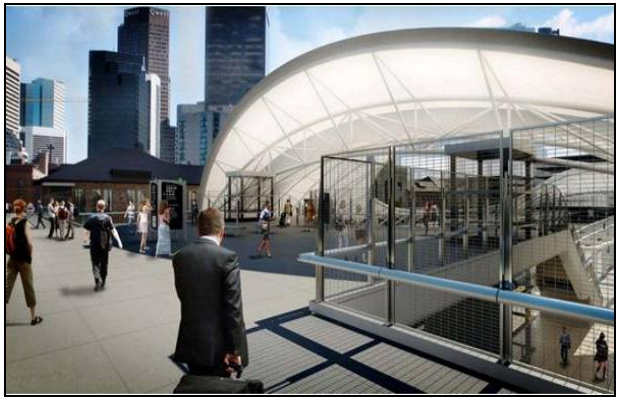
2. ***Regional Station:*** Would generally be located at a subregional downtown, a town center or a major employment center, characterized by a mix of medium-high density residential, employment (e.g., mid-rise office and residential towers, office/medical/educational/research campus), cultural, and entertainment uses, with supportive retail and services usually at somewhat lower densities and intensities than in system hub locations. Regional stations may be served by both the intercity and commuter rail service. They would serve as commuter hubs for the subregions of a metropolitan area, and may be served by multiple transit options, often including fixed-guideway regional transit (light rail, streetcar), high-frequency regional express bus or bus rapid transit (BRT), as well as local fixed-route bus service. Regional stations may also be served by park-and-ride facilities, usually taking the form of structured parking. In general, they may be less dependent on transit access and more dependent on parking than a system hub. Regional stations typically attract ridership from within a 10- to 15-mile radius around the station.
3. ***Local Station:*** Would generally be located in a suburban town center, the central activity center of a master planned community or the historic downtown of a rural freestanding community, characterized by a mix of residential, civic, employment, and retail uses (e.g., "Main Street" commercial, garden office buildings), at lower intensities than those around regional stations. They serve as trip generators for commuters; some may serve as attractions as well. Local stations capture inbound and outbound commuters via commuter rail. Intercity passenger rail typically does not stop at local stations, but may stop at a local station that is strategically located to capture riders from smaller communities between larger metropolitan areas. These stations may, however, be connected to a subregional transit network, including downtown circulator routes, fixed-route bus service, and potentially express bus. Local stations are generally supported by park-and-ride facilities. In a suburban setting, local stations typically attract ridership from within a 5- to 20-mile radius around the station. In a rural setting, local stations often attract ridership from within a 20- to 40-mile radius.
4. ***Transit Emergent Station:*** Would generally be located in the heart of a small town outside a major metropolitan area, which is part of a larger regional economy and expects considerable growth to occur in a 15- to 20-year period. The station area would have a mix of retail and service uses, residential and civic uses (e.g., "Main Street" commercial, garden office buildings, apartments/townhomes, row houses), at intensities generally lower than those around local stations. They would serve primarily as trip generators for commuters. Intercity passenger rail would not stop at these stations. "Transit emergent" means that there may currently be little or no local transit service to the station, but such service is expected to emerge (e.g., regional transit connections between communities) as regional rail service matures and local community development recognizes this rail service accessibility, seeking to locate at or near access points.

Table 1 provides a summary overview of the key characteristics of the station types discussed above. It is intended to function as a reference tool for use by communities along the final alignment for passenger rail, to assess their qualification as a potential station location. It also outlines the type of transportation access that may be available at different station types.

Table 1: Station Area Typology Overview

Station Type	Typical Urban Setting	Employment/ Commercial Land Use Types	Residential Land Use Types	Transit Patronage Area	Typical Transportation Modes and Parking Types
System Hub	Downtown/ center of metropolitan area	Primary office, government, and cultural/sports/ entertainment center with supportive retail and services	High-density, multi-family housing	15 to 25 miles	Intermodal facility/transit hub; Major regional destination with high- quality feeder transit (light rail, streetcar, bus, circulator); Potential park-and-ride location with structured parking integrated into mixed use development.
Regional Station	Subregional downtown or major employment center	Regional employment hub and major activity center (retail, services, education, medical, entertainment)	Mid- to high-density residential, often as part of mixed-use developments	10 to 15 miles	May be a subregional destination on fixed-guideway transit corridor, or subregional transit center with high quality feeder bus service, including local activity center circulator; Potential park-and-ride location with structured parking.
Local Station	Suburban town center, master planned community commercial core, or historic downtown of rural community	Office/service/retail economic activity center, potential regional government service center	Mid-density multi-family, and higher density single family (e.g., townhouses, row houses)	5 to 20 miles (Suburban) 20 to 40 miles (Rural)	Local activity center linked with high quality feeder bus services (e.g., express bus, regional fixed-route bus routes); Potential park-and-ride location with decked parking or surface lots.
Transit Emergent Station	Center of a small town outside a major metropolitan area with significant surrounding growth potential	Office/service/retail center, potential civic service center; often a historic "Main Street" activity node	Medium-density multi-family, possibly single family (e.g., row houses, patio homes)	20 to 40 miles	Transit station with future connections to local feeder bus service, and regional bus transit with service to adjacent towns/cities; Potential park-and-ride location with surface parking.

Table 2: System Hub Characteristics



Influence Area Characteristics	Area	Desired Land Use Mix	Typical Land Uses	Typical Building Heights	Average Employment Density	Average Residential Density	Parking Types
Transit Core ▪ 1/4 mile radius from station ▪ 5-minute walk	125 acres	▪ Up to 75% employment ▪ Up to 35% residential ▪ Up to 10% other	▪ Corporate offices ▪ Government offices ▪ Regional sports/ entertainment ▪ Convention/conference facilities ▪ High-rise residential towers	10 stories or more	3.0 – 5.0 FAR (Floor Area Ratio)	100+ DU/acre	▪ Multi-story structure
Transit Neighborhood ▪ 1/2 mile radius from station ▪ 10-minute walk	375 acres	▪ Up to 60% employment ▪ Up to 50% residential ▪ Up to 15% other	▪ Mid-high rise office towers ▪ Mid-high rise residential towers ▪ Government/educational/ employment/research campuses	6 stories or more	1.5 – 3.0 FAR	50 - 100 DU/acre	▪ Multi-story structure
Transit Supportive Area ▪ 1 mile radius from station ▪ 20-minute walk ▪ 5-minute drive	1,500 acres	▪ Up to 40% employment ▪ 60% or more residential ▪ 15% or more other	▪ Lofts/condominiums ▪ Mid-rise residential towers ▪ Apartments/townhomes ▪ Office/research park ▪ Medical facilities ▪ Lifestyle retail centers ▪ Mixed-use developments	4 stories or more	0.5 – 1.5 FAR	25 - 50 DU/acre	▪ Short term: surface lot ▪ Long term: parking deck

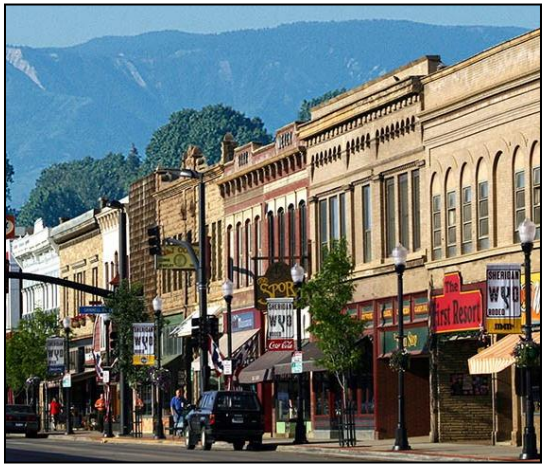
Table 3: Regional Station Characteristics

Influence Area Characteristics	Area	Desired Land Use Mix	Typical Land Uses	Typical Building Heights	Average Employment Density	Average Residential Density	Parking Types
Transit Core ▪ 1/4 mile radius from station ▪ 5-minute walk	125 acres	▪ Up to 70% employment ▪ Up to 50% residential ▪ Up to 15% other	▪ Mid-high rise office towers ▪ Mid-high rise residential towers ▪ Government/educational/ employment/research campuses	6 stories or more	1.0 – 3.0 FAR	50 - 100 DU/acre	▪ Multi-story structure
Transit Neighborhood ▪ 1/2 mile radius from station ▪ 10-minute walk	375 acres	▪ Up to 60% employment ▪ 50% or more residential ▪ 15% or more other	▪ Lofts/condominiums ▪ Mid-rise residential towers ▪ Apartments/townhomes ▪ Office/research park ▪ Medical facilities ▪ Lifestyle retail centers ▪ Mixed-use developments	4 stories or more	0.5 – 1.0 FAR	25 - 50 DU/acre	▪ Multi-story structure or parking deck
Transit Supportive Area ▪ 1 mile radius from station ▪ 20-minute walk ▪ 5-minute drive	1,500 acres	▪ Up to 40% employment ▪ 60% or more residential ▪ 15% or more other	▪ Apartments/townhomes ▪ Row houses ▪ Office/research park ▪ Garden office buildings ▪ Multi-use developments	2 stories or more	0.35 – 0.5 FAR	18 - 25 DU/acre	▪ Long term: parking deck ▪ Short term: surface lot

Table 4: Local Station Characteristics

Influence Area Characteristics	Area	Desired Land Use Mix	Typical Land Uses	Typical Building Heights	Average Employment Density	Average Residential Density	Parking Types
Transit Core ▪ 1/4 mile radius from station ▪ 5-minute walk	125 acres	▪ Up to 60% employment ▪ Up to 50% residential ▪ 15% or more other	▪ Lofts/condominiums ▪ Mid-rise residential towers ▪ Apartment/townhouse complexes ▪ "Main Street" commercial/ mixed use development ▪ Government service center ▪ Office/research park	4 stories or more	0.5 – 1.0 FAR	25 - 50 DU/acre	▪ Multi-story structure or parking deck
Transit Neighborhood ▪ 1/2 mile radius from station ▪ 10-minute walk	375 acres	▪ Up to 40% employment ▪ 50% or more residential ▪ Up to 15% other	▪ Apartments/townhomes ▪ Row houses ▪ Garden office buildings ▪ Multi-use developments	3 stories or more	0.35 – 0.5 FAR	18 - 25 DU/acre	▪ Surface lot
Transit Supportive Area ▪ 1 mile radius from station ▪ 20-minute walk ▪ 5-minute drive	1,500 acres	▪ Up to 30% employment ▪ 70% or more residential ▪ 10% or more other	▪ Apartments/townhomes ▪ Patio home/zero lot line residential ▪ Garden office buildings ▪ Multi-use developments	2 stories or more	0.25 – 0.35 FAR	8 - 18 DU/acre	▪ Surface lot

Table 5: Transit Emergent Station Characteristics

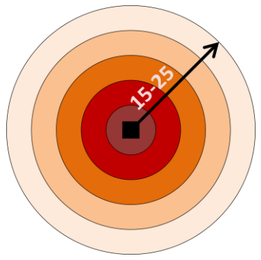
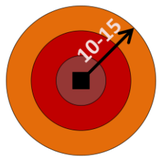
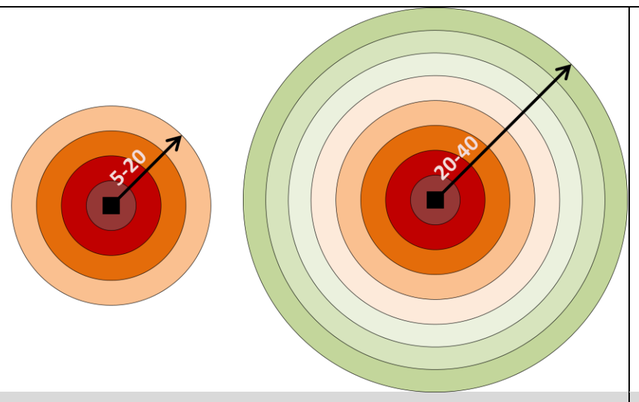
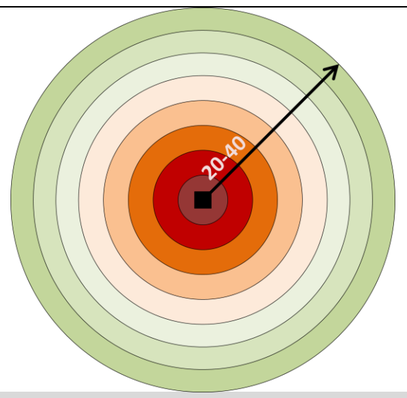
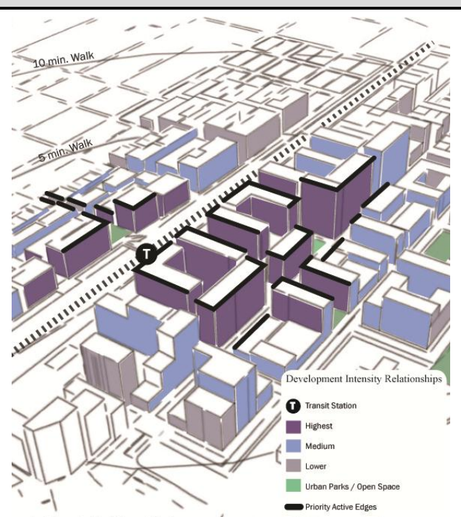
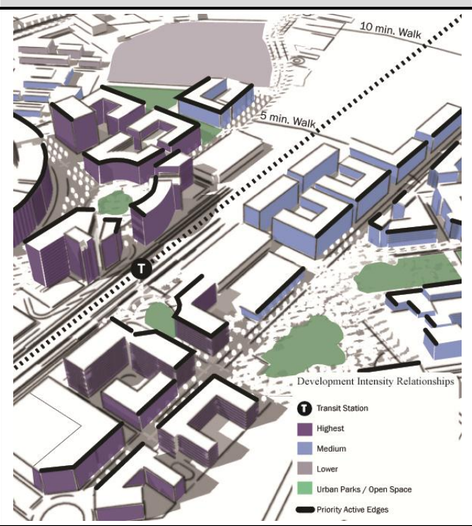
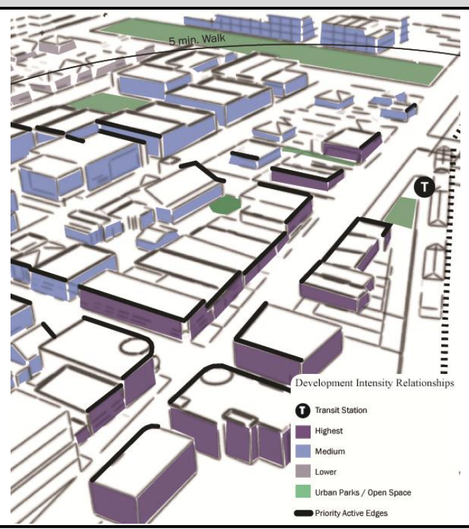
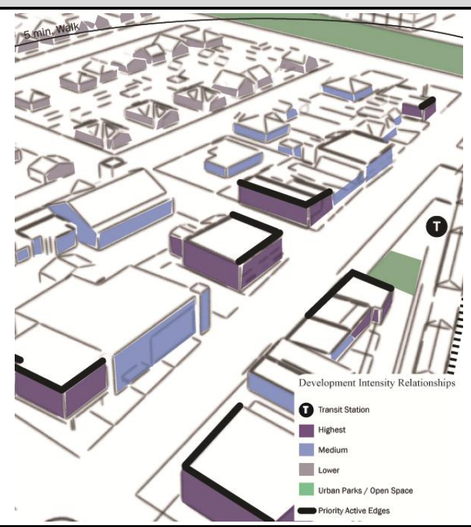


Influence Area Characteristics	Area	Desired Land Use Mix	Typical Land Uses	Typical Building Heights	Average Employment Density	Average Residential Density	Parking Types
Transit Core ▪ 1/4 mile radius from station ▪ 5-minute walk	125 acres	▪ Up to 40% employment ▪ 60% or more residential ▪ 10% or more other	▪ "Main Street" commercial/ mixed use development ▪ Apartments/townhomes ▪ Row houses ▪ Government service center ▪ Garden office buildings	2 stories or more	0.5 – 1.0 FAR	15 - 35 DU/acre	▪ Surface lot, with plans for structured parking deck
Transit Neighborhood ▪ 1/2 mile radius from station ▪ 10-minute walk	375 acres	▪ Up to 30% employment ▪ Up to 80% residential ▪ 5% or more other	▪ Apartments/townhomes ▪ Row houses ▪ Garden office buildings ▪ Multi-use developments	2 stories or more	0.25 – 0.5 FAR	10 - 25 DU/acre	▪ Surface lot
Transit Supportive Area ▪ 1 mile radius from station ▪ 20-minute walk ▪ 5-minute drive	1,500 acres	▪ Up to 20% employment ▪ 80% or more residential ▪ 5% or more other	▪ Patio home/zero lot line residential ▪ Row houses ▪ Garden office buildings ▪ Multi-use developments	1 story	0.15 – 0.25 FAR	8 - 12 DU/acre	▪ Surface lot

Supportive Transportation Infrastructure

Each of the four station types discussed above will have different transit connectivity characteristics, based on the urban context in which they are located, and the passenger patronage area associated with them. Table 6 provides an overview of the general patronage area for each station type by location (urban or rural), generally available transit connections (LRT, modern streetcar, BRT, local and circulator bus system), bicycle and pedestrian infrastructure, and parking facilities. The table also provides typical block sizes and development densities that support walkability within the station area, enhancing the attractiveness of the development. Table 6 is intended to serve as a guidance tool for cities and towns to decide which station category is closest to their current, as well as desired, local community character, and help them plan future transit-oriented development and enhanced transit access in their communities.

Table 6: Supportive Transportation Infrastructure

Passenger Patronage Area				
	15-25 miles	**10-15 miles**	**5-20 miles (Suburban)** **20-40 miles (Rural)**	**20-40 miles**
Transit Modes	**System Hub Station**	**Regional Station**	**Local Station**	**Transit Emergent Station**
Light Rail Transit (LRT)	▪ Fixed-guideway rail transit in exclusive right-of-way with stops averaging every 1 mile ▪ Multiple routes serving regionally-significant activity and employment centers, high-density residential nodes	▪ Fixed-guideway rail transit in exclusive right-of-way with stops averaging every 1 mile ▪ Located along a route serving regionally-significant activity and employment centers, high-density residential nodes		
Modern Streetcar/ Hybrid	▪ "Lighter light rail" operating in mixed traffic with stops averaging 1/2 to 1 mile ▪ May provide local circulation as well as commuting	▪ "Lighter light rail" operating in mixed traffic with stops averaging 1/2 to 1 mile ▪ May provide local circulation as well as commuting		
Bus Rapid Transit (BRT)/Express Bus	▪ Fixed routes operating in major transportation corridors with stops averaging 1 to 3 miles ▪ May operate in semi-exclusive right-of-way or mixed traffic ▪ Typically operates during peak periods only	▪ Fixed routes operating in major transportation corridors with stops averaging 1 to 3 miles ▪ May operate in semi-exclusive right-of-way or mixed traffic ▪ Typically operates during peak periods only	▪ Fixed route operating along major highways ▪ Limited stop express service between communities ▪ Schedule coordination with intercity and commuter rail	▪ Fixed route operating along major highways ▪ Limited stop express service between communities ▪ Schedule coordination with commuter rail
Local Bus	▪ All-day, fixed-route local arterial bus service with stops averaging 1/4 to 1/2 miles ▪ May offer higher frequency during peak periods ▪ Accessible buses; articulated where necessary	▪ All-day, fixed-route local arterial bus service with stops averaging 1/4 to 1/2 miles ▪ May offer higher frequency during peak periods ▪ Accessible buses; articulated where necessary	▪ All-day, fixed-route bus service along main roads with stops averaging 1/4 to 1/2 miles ▪ May offer higher frequency during peak periods ▪ Accessible buses	▪ All-day, fixed-route bus service along main roads with stops averaging 1/4 to 1/2 miles ▪ May offer higher frequency during peak periods ▪ Accessible buses
Shuttle/Circulator Bus	▪ Circulates within activity center and to adjacent neighborhoods ▪ Frequent stops (averaging 1/4-mile) ▪ Provides feeder or distribution service to and from transit centers, activity centers, or rail stations ▪ May have multiple routes connecting local activity nodes, parking and rental car facilities in the station district	▪ Circulates within activity center and to adjacent neighborhoods and communities ▪ Frequent stops (averaging 1/4-mile) ▪ Provides feeder or distribution service to and from transit centers, activity centers, or rail stations ▪ May have multiple routes connecting local activity nodes, parking and rental car facilities in the station district	▪ Circulates within activity center and to adjacent neighborhoods ▪ Frequent stops averaging 1/4-mile or less (or flag-down service ▪ Provides feeder or distribution service to and from transit center/rail station	▪ Circulates within activity center and to adjacent neighborhoods ▪ Frequent stops averaging 1/4-mile or less (or flag-down service ▪ Provides feeder or distribution service to and from transit center/rail station
Bikeways	▪ Bike lanes and/or paths throughout the station district ▪ Provide access to transit hubs from within a moderate (1-5 mile) distance ▪ May be on-street, off-street or a combination	▪ Bike lanes and/or paths throughout the station district ▪ Provide access to transit hubs from within a moderate (1-5 mile) distance ▪ May be on-street, off-street or a combination	▪ Bike lanes and/or paths throughout the station district ▪ Provide access to transit hubs from within a moderate (1-5 mile) distance ▪ May be on-street, off-street or a combination	▪ Bike lanes and/or paths throughout the station district ▪ Provide access to transit hubs from within a moderate (1-5 mile) distance ▪ May be on-street, off-street or a combination
Pedestrian Pathways	▪ Pedestrian pathways along all streets with shaded sidewalks, buffered from vehicular traffic by landscaping ▪ Mid-block plazas with pedestrian linkage to streets ▪ Provide access to transit hubs from within a short (0-1 mile) distance	▪ Pedestrian pathways along all streets with shaded sidewalks, buffered from vehicular traffic by landscaping ▪ Mid-block plazas with pedestrian linkage to streets ▪ Provide access to transit hubs from within a short (0-1 mile) distance	▪ Pedestrian-oriented streets with shaded sidewalks, buffered from vehicular traffic by landscaping ▪ Provide mid-block pedestrian linkage ▪ Provide access to transit hubs from within a short (0-1 mile) distance	▪ Pedestrian-oriented streets with shaded sidewalks, buffered from vehicular traffic by landscaping ▪ Provide mid-block pedestrian linkage ▪ Provide access to transit hubs from within a short (0-1 mile) distance
Vehicular Parking Facilities	▪ Multi-story parking structures/decks integrated into mixed use developments	▪ Multi-story parking structures/decks	▪ Decked parking/surface parking lot	▪ Surface parking lot
Typical Station Area Surrounding Density				
Typical Block Size	200' – 400' with pedestrian penetration every 200' Max. block perimeter: 1200' Study Area Reference: Phoenix CBD – 340' X 340'	200' – 400' with pedestrian penetration every 200' Max. block perimeter: 1200' Study Area Reference: Tempe CBD – 340' X 370'	200' – 400' with pedestrian penetration every 200' Max. block perimeter: 1200' Study Area Ref.: Casa Grande Downtown – 300' X 300'	200' – 400' with pedestrian penetration every 200' Max. block perimeter: 1200' Study Area Reference: Coolidge Downtown – 600' X 300'